

**Figueira Decl. Tab**  
**10**

Forwarded message

I published some rough numbers here:

This is just a storage estimate. The main component of machine cost will be GFS chunk servers which correlates directly to the storage estimates but I'm not sure how to account for those.

-Jeff

```
> capex is
> opteron $660
> RAM/GB $90
> Disk/TB $200
>
> btw, our pso folks perhaps know about tv recording. they have such a system
> that ingest into google backend.
>
>
> On 4/24/07, Franck Chastagnol <franckc@google.com> wrote:
> > Hi Jeff and Bo,
> >
> > I'm trying to get to the business the hardware and maintenance cost of
> adding 1 hour of video to the reference fingerprint database.
> > The idea is that we may bill some of the companies wanting to block
> content on YT. And we would use this per hour cost for as price tag.
> > I would like to get conservative numbers (better edge on the higher side
> in terms of costs).
> > Assumption is 300,000 lookup daily, with 5min long lookup videos.
> >
> > Jeff: could you tell us how much hard disk space and how much RAM are
> needed to handle 1 hour of ref fingerprint ?
> > It is ok to be conservative and for performance reason say that everything
> has to be in RAM.
> >
> > Bo: would you know the capex for a linux server in a datacenter at google
> ?
> > and what are the specs of such a server in terms of hard drive space and
> RAM ?
```

DATE: 12/10/08 EXHIBIT# 19  
DEPONENT: Chastagnol  
CASE: Viacom, et al., v. YouTube, et al., The Football  
Association Premier League, et al., v. YouTube, et al.,  
Case Nos. 07-CV-2203 and 07-CV-3582  
A. Ignacio Howard, CLR, RPR, CSR No. 9830

>>  
>> For your reference, I have pasted below an email thread we had which was  
> related.  
>>  
>> Let me know any question  
>>  
>> Thanks,  
>> Franck  
>>  
>>  
>>  
>> On 4/5/07, Jeff Faust <jfaust@google.com> wrote:  
>>> It's hard for me to come up with good numbers until the design for the  
>>> LSH engine is finalized. There are two distinct paths we can take for  
>>> that design. It also looks like there are some sublinear costs. One  
>>> design makes the cost per reference second much higher initially with  
>>> the incremental cost as reference material is added very low eventually  
>>> increasing to something like linear cost per reference video second.  
>>>  
>>> I'll try to get a handle on this as soon as possible and give you some  
>>> real answers.  
>>>  
>>> -Jeff  
>>>  
>>> On 4/4/07, Jeremy Doig <jeremydo@google.com> wrote:  
>>>> we chatted about this today briefly - do we really need to keep the  
> video ?  
>>>> I'm intrigued by the idea of a piece of software that looks at what is  
>>>> coming in the video card and drops out fingerprints every [interval].  
> if you  
>>>> assume all broadcast content is copyright in some fashion, all you  
> need is a  
>>>> tribune feed on top of that [or something more accurate].  
>>>> i think we should be careful about saying we can do something like  
> this  
>>>> though. and could only be done when the algo is stable.  
>>>>  
>>>>  
>>>> On 4/4/07, Jay Yagnik <jyagnik@google.com> wrote:  
>>>>> [[ +Jeff, Jeremy]]  
>>>>>  
>>>>> Jeff has been playing with the designs for disk vs. memory systems  
> lately.  
>>>>> I'll let him comment on the estimates.  
>>>>>  
>>>>>  
>>>>> On 4/4/07, Franck Chastagnol <franckc@google.com> wrote:  
>>>>>> Hi Jay,  
>>>>>>  
>>>>>> So the business asked if we could record some TV channels 24/7 and  
> add  
>>>>>> this content to our reference fingerprint DB.  
>>>>>> Besides the technical issues (like commercials, etc...) we wanted  
> to  
>>>>>> also have them understand the infrastructure cost of this.  
>>>>>>  
>>>>>> So assuming:  
>>>>>> - 1Gb of disk storage costs X dollars

>>>>> - 1Gb of memory costs Y dollars  
>>>>> - 300,000 lookups per day, with an average video length of 5min  
>>>>>  
>>>>> Then my question is: what is the infrastructure cost for every  
> hour of  
>>>> reference content we add to the video fingerprinting reference DB ?  
>>>>>  
>>>>> Again, I'm not looking at detailed number. Just a rough estimate  
> (edging  
>>>> on the high side rather than low side).  
>>>>>  
>>>>> Thanks for all your help,  
>>>>> Franck  
>>>>>  
>>>>>  
>>>>>  
>>>>  
>>>>  
>>>>  
>>>  
>>  
>>  
>  
>

---

10-0003